REMARKS/ARGUMENTS

Support for the wording added to claim 1 and for the new claims is found in the specification as filed in paragraph **[0032]** bridging pages 11 and 12. No new matter is presented.

The rejection of claims 1-15 as either anticipated or obvious over the disclosure of Thomas US 6,273,968 B1 is respectfully traversed. While Thomas '968 discloses the alloy microstructure that is the subject of the present application and the fact that an alloy of this microstructure can be formed by cold working, conventional cold working processes are performed in several stages with intermediate patenting treatments to soften the steel for continued cold working. This is explained in Applicants' present specification in the section entitled "Description of the Prior Art," in paragraph **[0004]** bridging pages 1 and 2, and is also confirmed by Thomas et al. US 4,619,714, which states at column 2, lines 13-19, that "The present invention, as contrasted to *conventional method of patenting pearlitic steel to produce wire*, provides a process whereby an alloy of relatively simple composition can be processed into wire or rods in a single continuous multipass operation, i.e., without *intermediate annealing or patenting heat treatments*." (Emphasis added) Thus, despite the disclosure in Thomas et al. '714 that cold working of an alloy of particular microstructure could be achieved without the patenting treatments, Thomas et al. '714 is in agreement with the "Description of the Prior Art" section of the present application in acknowledging that the "conventional method" is one involving patenting. Thomas '968 does not disclose how to perform cold working other than by the conventional process, and Applicants submit that the elimination of patenting, which is part of the conventional process, is not disclosed in Thomas '968 and it would not be obvious to eliminate this art-recognized step.

As for Thomas US 4,619,714 itself, the rejection of claims 1-10 and 16-19 as either anticipated or obvious over this reference is likewise respectfully traversed. Thomas '714 discloses the cold working of certain steels without the intermediate patenting treatments, but the steels addressed by Thomas '714 are dual-phase steels that do not include laths of martensite alternating with thin films of austenite. This lath martensite/thin-film austenite structure is a specialized microstructure that is formed by processes disclosed in Thomas '968. A review of this patent will disclose that these processes differ considerably from those by which the dual-

phase steel of Thomas et al. '714 is formed. The dual-phase steel of Thomas et al. '714 is described as having a microstructure "which consists of a ferrite matrix and a dispersed second phase such as lath martensite, bainite, and/or austenite." (Column 1, lines 21-23). Further description appears in column 3, lines 50-54: "The preferred morphology produced according to the present invention is therefore a fibrous distribution of lath martensite in the longitudinal direction *in a matrix of fine grained ferrite*." (Emphasis added)

Reasons why the cold-working discovery of the present invention, i.e., the ability to achieve successful cold-working without intermediate patenting treatments, is not obvious over the disclosure of the same type of procedure in the dual-phase steels of Thomas et al. '714 arise from the differences in alloy composition and microstructure between the present invention and the reference. The matrix, and hence the phase present in the largest amount, in the dual-phase steels is ferrite, whereas in the lath martensite/thin-film austenite structure addressed by the present invention the matrix is martensite with the austenite present only in the form of thin films between the martensite laths. Ferrite and austenite are two different phases with different properties, and the amounts of each relative to the martensite in each of the two microstructures differs widely because of the microstructures themselves. This is now emphasized by the wording added to claim 1 of the present application as well as the new claims. The crystal structure of ferrite is body-centered cubic while austenite is face-centered cubic. The spaces between the iron atoms in the face-centered cubic lattice are greater, thereby allowing a greater number of interstitial atoms to be present, such as carbon and nitrogen. Austenite in fact can accommodate up to 2 weight percent C and up to 2.8 weight percent N. Ferrite, on the other hand, with its face-centered cubic structure, has its iron atoms closer together, leaving less room for other atoms. As a result, ferrite can accommodate at most only a few hundredths of a percent of C and N. Austenite and ferrite are both softer than martensite, but because of the different amounts of these alloy-hardening metal atoms that these two phases can accommodate, ferrite is softer that martensite.

When a multi-phase steel is subjected to cold-forming, the softer of the phases will be the first to deform. In the dual-phase steel, the ferrite matrix is considerably softer than the dispersed phase, whether the dispersed phase be martensite, bainite, or austenite. The initial

deformation therefore occurs in the ferrite phase, and a large amount of deformation can be achieved without cracking since the soft ferrite is present in such a large proportion. In the martensite-austenite lath structure, the austenite phase is the softer phase, and here as well, the initial deformation will occur in this phase. Austenite is less soft than ferrite however, and it is present in much smaller amounts since it is restricted to thin films between the laths of martensite. Thus, for the alloy to which the present invention is directed, there is less to deform in the initial stages because the austenite is present in a lesser amount, and the austenite is more difficult to deform than the ferrite. In this alloy, therefore, the martensite is more dominant, and the greater hardness of the martensite tends to suggest to those skilled in the art that cold working will be more difficult, and therefore that the intermediate patenting treatments are essential to successful cold working. Applicants have presently shown that this is not the case, and the fact that this discovery is contrary to the reasonable expectations of the person skilled in the art indicates that the ability to form an alloy with a martensite-austenite lath structure by cold working without intermediate patenting treatments is nonobvious and therefore patentable.

For these reasons, reconsideration of the application is respectfully requested. If there are any matters that Applicants have failed to address in these remarks or if any matters remain that can be resolved by a conference with Applicants' attorney, the examiner is encouraged to telephone the undersigned at 415-576-0200.

Respectfully submitted,

M. Henry Heines
Reg. No. 28,219

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: 415-576-0200
Fax: 415-576-0300
MHH:mhh
60564884 v1